

REMARKS

Claims 1, 3-29, 32-43 and 45-59 remain pending in the present application. Claims 1, 3, 14-16, 19, 25, 28-29, 38, 41-42 and 51 were amended to further clarify features already present in the claims. A marked up version indicating amendments to the claims are attached. Claims 53-59 were added to also further clarify features already present in the claims. These amendments and additions have added no new matter.

Objection to the Title

Applicants propose to change the title as the Examiner has suggested to "Hydro-Power Generation System For A Water Treatment System And Method Of Supplying Electricity Using A Flow Of Fluid."

Foreign Priority Claim

Applicants have noted the Examiners acknowledgement of a claim for foreign priority in the Office Action Summary. This application makes no claim of foreign priority. As indicated on page 1 of the specification lines 3-4, the application claims the benefit of U.S. patent application serial no. 60/157,760 filed on October 5, 1999 pursuant to 35 U.S.C. 119(e).

The 35 U.S.C. 102(b) Claim Rejections

Claims 1, 4, 6-8 and 16 were rejected pursuant to 35 U.S.C. 102(a) as being anticipated by U.S. Patent No. 4,740,711 to Sato et al. (hereinafter "Sato"). In addition, claims 19-21, 24-25, 28-31, 36-37, 41-44 and 51-52 were similarly rejected as being anticipated by U.S. Patent No. 4,731,545 to Lerner et al. (hereinafter "Lerner"). Applicants respectfully traverse these rejections for at least the following reasons.

Applicants have amended claim 1 to incorporate limitations disclosed in dependent claim 2 and cancelled dependent claim 2 to more clearly set forth the elements already disclosed in claim 1. Amended independent claim 1 discloses a hydro-power generation system that includes a housing having an inlet and an outlet and a rotor rotatable within the housing by a flow of fluid through the housing. Also included in the hydro-power generation system is a turbine nozzle that is fixedly coupled with the housing. The turbine nozzle

includes a tip and a plurality of struts to direct the flow of fluid to the rotor at increased velocity to rotate the rotor. The hydro-power generation system further includes a stator surrounding the rotor such that rotation of the rotor induces the production of electricity. As indicated by the Examiner, Sato fails to teach the limitation of a turbine nozzle for directing the flow of fluid to the rotor. Accordingly, Applicants respectfully request the Examiner to withdraw the 35 U.S.C. 102(b) rejection of claim 1.

Applicant's amended independent claim 19, discloses a hydro-power generation system that includes a housing with an impeller rotatably positioned within an airspace in the housing.

The system also includes a nozzle penetrating the housing and an outlet coupled with the housing. The nozzle directs a stream of fluid through the airspace to the impeller. Energy in the stream of fluid is transferred to the impeller to induce rotation of the impeller. After impact with the impeller, the fluid falls by gravity through the airspace to the outlet and is channeled out of the housing. The system further includes a generator rotatably coupled with the impeller such that rotation of the impeller induces the generation of electricity by the generator.

The Examiner has asserted that Lerner teaches the hydro-power generation system disclosed in claim 19. Applicants respectfully disagree. Lerner teaches a power conversion unit attached to the outlet of a pressurized fluid system, such as, the nozzle of a garden hose. As illustrated in FIG. 2 of Lerner, the body (10) of the power conversion unit includes an impeller housing (11) with an impeller (36) located therein. When pressurized fluid flows through the body some of the kinetic energy in the fluid is used to rotate the impeller without significantly diminishing the force and stream of the fluid emerging from the outlet of the body. (See Col. 4, lines 20-31)

Applicants have amended claim 19 to make clearer that this is exactly opposite of Applicants' invention where the fluid falls by gravity to the outlet after transferring energy to the impeller to induce rotation. Accordingly, almost all of the energy in the stream of fluid in Applicants' invention is transferred to the impeller. Thus, the force and stream of the fluid channeled out of the housing in Applicants' invention is significantly diminished when compared to the force of the stream of fluid directed to the impeller, in contradistinction to the teaching of Lerner. For at least the foregoing reasons, Applicants respectfully request the withdrawal of the 35 U.S.C. 102(b) rejection of claim 19.

Similarly, the Examiner has asserted that Sato and Lerner teach the limitations disclosed in dependent claims 16, 28, 41 and 51. The Examiner has based the rejection of these claims on lack of indication of flux concentrators in the figures of Sato or Lerner. As discussed in the specification on page 27 lines 20-25 and page 28 lines 1-23, the omission of flux concentrators in Applicants' invention beneficially reduces the rotational load associated with back electromagnetic force (EMF). Reduction of the back EMF provides relatively quick acceleration to a first RPM to initially energize an ultraviolet light source with a first voltage. Further, the continued energization of the ultraviolet light source is operable to reduce rotation to a second RPM and produce a second voltage as disclosed in dependent claims 16, 28, 41 and 51.

Neither Sato nor Lerner teach, suggest or disclose initial and continuous energization of an ultraviolet light source with a first and second RPM and a first and second voltage, respectively, in the absence of flux concentrators as disclosed by amended claims 16, 28, 41 and 51. Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. 102(b) rejection of claims 16, 28, 41 and 51.

With regard to claim 25, the Examiner has asserted that the blades of Lerner include parabolic shaped paddles. As disclosed by amended claim 25, Applicants' invention comprises at least two parabolic shaped paddles on each blade, which is not taught, suggested or disclosed by Lerner. Further, none of the prior art of record teaches, suggests or discloses a slot in each of the blades to allow energy in a stream of fluid to pass to another of the blades as the impeller rotates as disclosed by dependent claim 57.

Applicants' amended independent claim 29 discloses a method of supplying electricity using a flow of fluid which includes the limitations of providing a housing and rotating a rotor positioned in the housing as a result of fluid flowing through the housing. The rotor is surrounded by a stator. The method also includes directing the flow of fluid to the rotor with a turbine nozzle to increase the velocity of the flow of fluid. The turbine nozzle includes a tip and a plurality of struts. Further, the method includes generating electricity with the rotor and the stator when the rotor rotates.

The Examiner has asserted that the power conversion unit of Lerner teaches the construction of a hydro-power generation system with all the previously discussed elements. Therefore, according to the Examiner, the method of using it as described in claim 29 is

inherent to one with ordinary skill in the art. Applicants are unable to identify the elements as disclosed by claim 29 in Lerner and therefore respectfully disagree that one with ordinary skill in the art could inherently practice the method disclosed by claim 29. Specifically, Lerner does not teach, suggest or disclose elements that include a rotor within a housing surrounded by a stator that is rotated by a flow of liquid. Nor does Lerner disclose a turbine nozzle with a tip and a plurality of struts for increasing the velocity of the liquid. Accordingly, Applicants respectfully assert that Lerner does not "inherently" teach, suggest or disclose Applicants' method of supplying electricity using a flow of fluid as disclosed by claim 29. As such, Applicants respectfully request the withdrawal of the Examiner's 35 U.S.C. 102 (b) rejection of claim 29.

Similarly, dependent claim 36 discloses channeling the fluid to the outlet with a plurality of exit guide vanes. Lerner on the other hand, does not teach, suggest or disclose exit guide vanes, nor channeling fluid with such vanes as asserted by the Examiner. In addition, dependent claim 37 discloses the act of circulating the fluid to a bearing to cool and lubricate the bearing. Lerner does not include a discussion involving bearings, nor does it teach, suggest or disclose circulating fluid to cool and lubricate bearings. Accordingly, Applicants respectfully request the withdrawal of the 35 U.S.C. 102(b) rejection of claims 36, 37 and 41.

Applicants' amended independent claim 42 describes a method of supplying electricity using a flow of fluid. The method includes providing a housing having an airspace and supplying a flow of fluid to a nozzle such that the fluid sprayed from the nozzle is directed at an impeller rotatably positioned within the airspace. In addition, the method includes rotating the impeller and a rotor coupled to the impeller with the fluid. The rotor is cooperatively operable with a stator to form a generator. Further, the method includes channeling fluid that falls by gravity through the airspace after impact with the impeller out of the housing and generating electricity with the generator.

The Examiner has again postulated that the power conversion unit of Lerner teaches the construction of a hydro-power generation system with all the previously discussed elements, and therefore the method of using it as described in claim 42 is inherent to one with ordinary skill in the art. Applicants again respectfully disagree. As previously discussed, Lerner teaches that the energy in the stream of fluid is not significantly diminished upon

impact with the impeller. Claim 42 on the other hand has been amended to more clearly disclose that the energy in the stream of fluid is almost completely diminished following impact with the impeller. The almost complete energy transfer to the impeller is evidenced by the act of channeling fluid out of the housing that has fallen by gravity through the airspace to an outlet of the housing. For at least the foregoing reasons, Applicants respectfully request the Examiner to remove the 35 U.S.C. 102(b) rejection of claim 42.

The 35 U.S.C. 103(b) Claim Rejections

Claims 2-3, 5, 9-15, 17-18, 22-23, 26-27, 32-35, 38-40 and 45-50 were rejected pursuant to 35 U.S.C. 103(a) as detailed below. Applicants respectfully traverse these rejections for at least the following reasons.

The Examiner has rejected claims 2-3, 9 and 18, as being unpatentable over Sato in view of U.S. Patent No. 4,246,753 to Redmond (hereinafter "Redmond"). More specifically, the Examiner has indicated that Sato teaches the hydro-power generation system, with the exception of the turbine nozzle which is taught by Redmond. Applicants respectfully disagree that the turbine nozzle of Applicants' invention is taught, suggested or disclosed by Redmond.

Redmond teaches an energy salvage system positioned in a drainpipe or sewer system in which wet sewage is gravitationally conducted into a community sewer system. As illustrated in Fig. 2 of Redmond, the energy salvage system (10) includes a housing (12) with impellers (30) mounted on a central hub (32). (Col. 2, lines 63-65) The central hub is connected with a shaft (24) that is in turn connected with an electric generator (52). (Col. 3, lines 55-68) The kinetic energy and weight of sewage falling through a drainpipe and impinging on the impellers imparts clockwise rotation on the shaft such that the generator generates electricity. (Col. 3, lines 12-20) Redmond also teaches a pair of jet nozzles (48, 50) for discharging fluid or air under pressure to hit the impellers and loosen sewage and other material clinging to the impellers. (Col. 3, lines 28-42) In addition, Redmond discloses that the discharge of fluid or air may also be used to assist in maintaining rotation of the impellers when the impellers become clogged with sewage. (Col. 4, lines 54-64) Redmond further teaches that the discharge of fluid or air is used only intermittently and that the fluid or air is pressurized with a pump driven by the gravitationally falling sewage. (Col. 4, lines 34-44)



The Examiner has postulated an equivalency between the jet nozzles of Redmond and the turbine nozzle of amended claim 1 and claim 3. Clearly, the rotation of the impellers and the generation of electricity in Redmond is a result of falling sewage impinging upon the impellers. The jet nozzles of Redmond intermittently perform a simple cleaning operation and, as taught by Redmond, are intended only for temporary assistance to maintain rotation when the impellers become clogged with sewage. Amended independent claim 1, on the other hand, discloses that the turbine nozzle of Applicants' invention directs a flow of fluid to the rotor at increased velocity to rotate the rotor. Redmond fails to teach, suggest or disclose utilizing only a turbine nozzle to increase the velocity of a flow of fluid used to rotate a rotor.

In fact, application of the turbine nozzle of Applicants' invention to the apparatus disclosed by Redmond in an attempt to increase the velocity of the falling sewage and direct the sewage at the impellers at a predetermined angle of incidence would fail due to the solid materials present in the falling sewage. Further, the jet nozzles of Redmond clearly do not comprise a tip and a plurality of vanes as disclosed by amended claim 1. Accordingly, for at least the foregoing reasons, Applicants respectfully request the Examiner to remove the 35 U.S.C. 103(a) rejection of dependent claim 2 (now part of independent claim 1) and dependent claim 3.

With regard to claim 18, the Examiner has taken official notice of the equivalence of the contents of a sewer drainpipe with the contents of a water treatment system. Clearly, the apparatus disclosed in Redmond is not supplied liquid from a water treatment system as disclosed by dependent claim 18. Even if the sewage line carrying wet or fluid sewage in Redmond could somehow be considered a water treatment system, the fluid of Redmond is obviously not drinking water as disclosed by dependent claim 56. As such, removal of the 35 U.S.C. 103(a) rejection of dependent claim 18 is respectfully requested.

Claim 10 was similarly rejected as being unpatentable pursuant to 35 U.S.C. 103(a) over Sato in view of Lerner and further in view of U.S. Patent No. 6,011,334 to Roland (hereinafter "Roland"). In addition, claim 11 was similarly rejected as being unpatentable over Sato in view of Lerner and further in view of U.S. Patent No. 6,047,104 to Cheng (hereinafter "Cheng"). The Examiners application of three different prior art references to formulate a rejection of claims 10 and 11 is somewhat troubling to the Applicants. The

Examiner is respectfully reminded that it is impermissible to use the Applicants' own disclosure as a teaching or suggestion of the obviousness of a combination.

*To imbue one of ordinary skill in the art with the knowledge of the invention in suit , when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of hindsight syndrome wherein that which only the inventor taught is used against its teacher.*

W.L. Gore & Assoc., Inc. v. Garlock, Inc., 220 U.S.P.Q. 303, 312-313 (Fed. Cir. 1983). Cf., Ruiz v. A.B. Chance Co., 57 U.S.P.Q.2<sup>nd</sup> 1161, 1166 (Fed. Cir. 2000).

Claims 14-15 and 38-40 were rejected pursuant to 35 U.S.C. §103(a) as unpatentable over Sato in view of common knowledge in the art. The Examiner has asserted that it would be obvious to one having ordinary skill in the art to add a plurality of taps or switchable coils to change the voltage levels. None of the prior art of record teaches, suggests or discloses using taps or switchable coils to initially energize and then maintain energization of an ultraviolet light source by providing a first voltage and a second voltage, respectively, as disclosed in amended claims 14-15 and 38. Accordingly, Applicants respectfully disagree that taps or switchable coils to energize an ultraviolet light source are common knowledge, and therefore request removal of the 35 U.S.C. 103(a) rejection of claims 14-15 and 38-40.

For at least the foregoing reasons, independent claims 1, 19, 29 and 42 are patentably distinct over the prior art of record. Further, the dependent claims depending from claims 1, 19, 29 and 42 are also patentable over the prior art of record for the same reasons, or for at least the reasons Applicants have set forth above.

The prior art of record also fails to teach, suggest or disclose that the housing of claim 1 includes a first section detachably coupled with a second section as disclosed by claims 54 and 55. In addition, none of the prior art of record discloses adjusting the struts of the turbine nozzle of claim 29 to control the velocity of the fluid, adjust an angle of incidence, adjust efficiency, adjust turbulence and/or adjust pressure drop as disclosed by claims 58 and 59. Further, none of the prior art of record teaches, suggests or discloses a stator comprising a plurality of exit guide vanes and a fin as disclosed by claims 1 and 53.

The application is believed to now be in condition for allowance, which is respectfully requested. Should the Examiner deem a telephone conference to be beneficial in expediting

Serial No. 09/680,345

Filed: October 5, 2000

allowance of this application, the Examiner is invited to call the undersigned attorney at the telephone number listed below

Respectfully submitted,



Sanders N. Hillis  
Attorney Reg. No. 45,712

SNH

Attachments: Pages 14-17 - Version with markings to show changes made to the Claims.

BRINKS HOFER GILSON & LIONE  
One Indiana Square, Suite 2425  
Indianapolis, Indiana 46204  
Telephone: 317-636-0886  
Facsimile: 317-634-6701



VERSION WITH MARKINGS TO SHOW CHANGES MADE TO THE CLAIMS

1. (amended)A hydro-power generation system, comprising:
  - a housing that includes an inlet and an outlet;
  - a rotor rotatably positioned within the housing such that the rotor is rotated by a flow of fluid through the housing;
  - a turbine nozzle fixedly coupled with the housing, wherein the turbine nozzle comprises a tip and a plurality of struts operable to direct the flow of water to the rotor at increased velocity to rotate the rotor; and
  - a stator fixedly positioned to surround the rotor such that rotation of the rotor induces the production of electricity.
3. (amended)The hydro-power generation system of claim 1[2], wherein the turbine nozzle is operable to increase the velocity of the fluid and direct the flow of fluid to achieve a predetermined angle of incidence of the fluid upon the rotor.
14. (amended)The hydro-power generation system of claim 1, further comprising a plurality of taps and an ultraviolet light source energized with the electricity produced, wherein the taps are dynamically operable to provide different voltage levels of electricity to initially energize and continue to energize the ultraviolet light source.
15. (amended)The hydro-power generation system of claim 1, further comprising an ultraviolet light source and a plurality of coils, wherein the ultraviolet light source is energized with the electricity produced, and the coils are dynamically [that are] switchable from a parallel configuration to a series configuration to provide a first voltage for initial energization and a second voltage for continued energization of the ultraviolet light source.
16. (amended)The hydro-power generation system of claim 1, wherein the hydro-power generation system is operable [formed] without flux concentrators to accelerate to a first RPM to initially energize an ultraviolet light source with a first voltage, wherein continued energization of the ultraviolet light source is operable to slow rotation of the hydro-power generation system to a second RPM and produce a second voltage.

19. (amended) A hydro-power generation system, comprising:  
a housing having an airspace therein;  
an impeller rotatably positioned within the airspace;  
a nozzle fixedly positioned to penetrate the housing, wherein the nozzle is operable to direct a stream of fluid through the airspace to the impeller, energy in the stream of fluid transferred to [and provide an inlet for fluid into the housing, wherein the nozzle is operable to provide a stream of fluid that is directable at] the impeller to induce [the] rotation of the impeller;  
an outlet coupled to the housing, wherein the fluid is operable to fall by gravity through the airspace to the outlet and be[to] channeled [the fluid directed at the impeller] out of the housing; and  
a generator rotatably coupled to the impeller, wherein rotation of the impeller induces the generation of electricity by the generator.
25. (Amended) The hydro-power generation system of claim 24, wherein each of the blades comprise at least two parabolic-shaped paddles.
28. (amended) The hydro-power generation system of claim 19, wherein the generator is operable [formed] without flux concentrators to accelerate to a first RPM to initially energize an ultraviolet light source with a first voltage, wherein continued energization of the ultraviolet light source is operable to slow rotation of the generator to a second RPM and produce a second voltage.
29. (amended) A method of supplying electricity using a flow of fluid, the method comprising:  
providing a housing that includes an inlet and an outlet;  
supplying the flow of fluid to the inlet of the housing, wherein the fluid flows through the housing to the outlet;

rotating a rotor that is positioned in the housing such that the rotor is surrounded by a stator, wherein the rotor rotates as a result of the fluid flowing through the housing;

channeling the fluid flowing through the housing to the rotor with a turbine nozzle to increase the velocity of the flowing fluid, wherein the turbine nozzle comprises a tip and a plurality of struts; and

generating electricity with the rotor and the stator, wherein rotation of the rotor induces the generation of electricity.

38. (amended)The method of claim 29, further comprising the act of dynamically adjusting the voltage and current levels of the electricity with a plurality of coils in response to initial energization and continued energization of an ultraviolet light source by the electricity generated.

41. (amended)The method of claim 29, further comprising the acts of accelerating [forming] the hydro-power generation system [without] in the absence of flux concentrators to a first RPM to initially energize an ultraviolet light source; and slowing the hydro-power generation system to a second RPM and a second voltage by continued energization of the ultraviolet light source.

42. (amended) A method of supplying electricity using a flow of fluid, the method comprising:

providing a housing having an airspace;  
supplying the flow of fluid to a nozzle;  
directing the fluid sprayed from the nozzle at an impeller rotatably positioned within the airspace;

rotating the impeller and a rotor fixedly coupled to the impeller with energy transferred from the fluid, wherein the rotor is cooperatively operable with a stator to form a generator;

channeling fluid out of the housing, wherein the fluid falls by gravity through the airspace to an outlet of the housing after impact with the impeller; and

generating electricity with the generator.

51. (amended)The method of claim 42, further comprising the acts of accelerating[forming] the generator in the absence of[without] flux concentrators to a first RPM to initially energize an ultraviolet light source with a first voltage; and slowing rotation of the generator to a second RPM and a second voltage by continued energization of the ultraviolet light source.